

# Branch LINES

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## New-Age Forestry?

A recent book "Creating a Forestry for the 21st Century"<sup>1</sup> called for "...changing the focus of forest management from quantity to quality, from industrial-type production to the provision of goods and services. This paradigm shift is not unique to forestry. *It is part of a much broader move from the industrial age to the information age*" (my italics) (p. 357). Foresters everywhere no doubt hear such sentiments suggesting that, in this new age, silicon chips will replace wood chips and there will be little need for structural wood products. Nowhere are these views as virulent as they are in B.C. Such claims bear careful scrutiny. Just what does the *information age* mean for forestry?

It is fruitful to begin with what it does not mean. The World Resources Institute<sup>2</sup> — hardly a sycophant for the forest industry — estimates that world demand for wood is *increasing* at a rate of 75 million m<sup>3</sup>/yr. In comparison, the current allowable annual cut in B.C. is about 70 million m<sup>3</sup>/yr. Due to population growth and increased income, each and every year the world consumes an additional amount of wood equivalent to finding a new B.C.! Apparently the prosaic problems of timber supply will remain important well into the next millennium. Just who do the information-agers imagine will attend to these problems, if not foresters?

Of course, asserting that timber supply will remain an important issue in forestry does not imply that the nonmarket service of forests are not simultaneously becoming more important. A recent article<sup>3</sup> by Robert Constanza and colleagues argues that the value of ecosystem services from the world's forests equals \$969/ha/yr.

Rough estimates I have recently compiled for the U.S. suggest that their forest-based recreation is worth about as much as their industrial timber production, and that the carbon sequestration services of their forests are worth about a third as much.

Demand for timber and fuelwood is increasing at precisely the same time that the nontimber services are becoming more valuable. Here is where the information-age paradigm has currency for forestry: how do we "produce" more of all of these forest outputs from a more-or-less fixed forest land base? Doing so will surely require far greater knowledge and greater reliance on science and technology than has been the case in the past. The need extends from advanced satellite-based remote sensing to the biotechnology of forest trees; from more sophisticated ecosystem science (especially large-scale experimentation) to the suite of technologies that make more efficient use of wood possible (e.g. scanning and optimization technologies, new approaches to wood building design and construction, robotics in value-added processing).

Such a technology-based approach is consistent with leading thinking about human relations with the environment more broadly. Four distinguished ecologists recently analyzed human impact on the Earth's ecosystems, finding that we have transformed between one third and one half the Earth's land surface, and have had a major impact on key carbon, nitrogen and water cycles.<sup>4</sup> They conclude "[H]umanity's dominance of earth means that we cannot escape responsibility for managing the planet." (p. 499) This responsibility requires, they argue, using resources more efficiently and understanding better both the natural and social scientific aspects of ecosystems. These are sensible prescriptions for forestry as well.

Our capacity to substitute information-age knowledge for natural resources depends on the investments we make in producing and adapting new knowledge. Canada's current performance in this respect has, with one notable exception, been poor. A recent study found that R&D — public and private — in the Canadian forest sector was generally low and declining (in 1994, one U.S. firm, International Paper Company, spent more on R&D than did the entire Canadian industry)<sup>5</sup>. The only bright spot in this otherwise bleak landscape has been the research program of Forest Renewal BC. Originally targeted at between 10-15% of their total expenditures, last year Forest Renewal spent about \$40 million on R&D activities ranging from environmental protection to growing trees to value-added forest products. Maintaining this program — and expanding it to its intended size — is critical to our future. But even with Forest Renewal's current research program, total forest sector R&D in B.C. still falls far short of the standard in such other advanced forested countries as Sweden, the U.S. or Japan. And extensive *public* ownership of forest land in B.C. implies a special responsibility for *publicly* funded forestry research far greater than in these other jurisdictions.

The information age is creating amazing new technologies and understanding. This revolution does not imply that material demands on the world's forests will necessarily diminish, but rather that foresters have powerful new tools to meet those demands while responding affirmatively to the increasingly valuable ecosystem services of our forests. Effective adaptation of these information-age tools to forest conservation, management products and production processes comprises a major challenge to forest stewardship now and in the 21st century.

Clark S. Binkley  
Dean

<sup>1</sup>Kohm, Kathryn A. and Jerry F. Franklin (eds.). 1997. *Creating a Forestry for the 21st Century: The Science of Ecosystem Management*. (Island Press, Washington, DC).

<sup>2</sup>World Resources Institute. 1994. *World Resources, 1994-1995*. (Oxford University Press: New York).

<sup>3</sup>Costanza, Robert *et al.* 1997. The value of the world's ecosystem services and natural capital. *Nature* 387:253-260.

<sup>4</sup>Vitousek, P.M., H.A. Mooney, J. Lubchenco and J. M. Melillo. Human domination of earth's ecosystems. *Science* 277:494-499.

<sup>5</sup>Binkley, C.S. and Otto L. Forgacs. 1997. Status of forest sector research and development in Canada. Paper presented at the National Forest S&T Forum, Toronto, ON.

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# Potential financial returns from alternative silvicultural prescriptions in B.C. second-growth

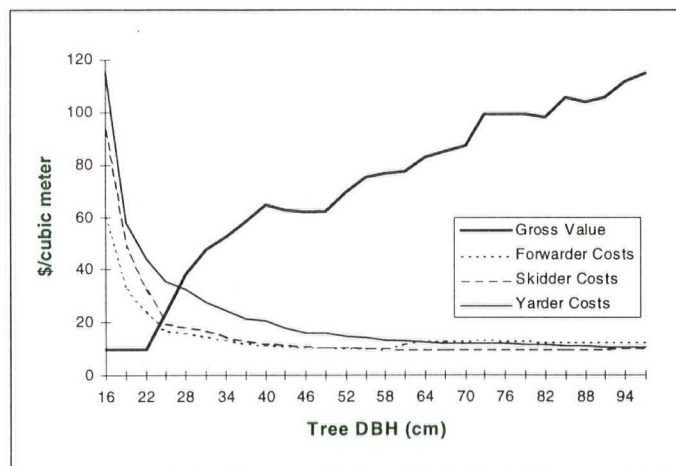
**A**LTERNATIVE harvesting methods for partial cutting in commercial thinnings or seed tree, shelterwood, and selection management silvicultural systems have yet to be proven as either operationally or economically feasible in the majority of second-growth stands of coastal British Columbia. Successful design of treatments requires that available equipment options and alternative engineering practices be carefully matched to silvicultural and site requirements to ensure both operational and economic viability. A study was made of the potential financial returns from nine alternative silvicultural prescriptions applied to four case-study stands of second growth in coastal B.C. The objectives were to compare prescriptions based on partial cutting to conventional clearcutting, and to explore the effects of harvesting costs and harvesting systems on potential returns. Inventory data were obtained for four case-study second-growth

stands representing a wide range of both stocking and species composition. Prescriptions based on shelterwood, uneven-age management and intermediate commercial thinnings followed by clearcutting were specified. The PROGNOSIS growth and yield simulation program was used to model stand responses. Logging costs and timber gross and net values were estimated using a timber harvesting

simulation model. Discounted cashflow analysis was used to compare the prescriptions. The findings showed that prescriptions based on partial cutting were more profitable than conventional clearcutting in only a few cases, but competitive in most. The study also showed that the range in harvesting costs as a function of tree size was essentially identical to the range in gross value (see figure). Commonly poor market conditions, particularly low pulp-

wood prices, are blamed for precluding profitable partial cutting operations; however, high logging costs are also to blame. Integrated design of individual treatments and whole prescriptions involving both silvicultural objectives and the economics of timber harvesting were recommended as a means for promoting partial cutting even when market conditions are unfavorable.

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*The effect of tree size on timber values and logging costs for clearcutting with three different harvesting systems.*

## DEPARTMENT NEWS

**D**r. Gordon Baskerville, Department Head, has announced his retirement at the end of December. Dr. Tony Kozak will be Acting Head until a decision is made regarding a replacement.

Dr. Andrew Howard has tendered his resignation from the Faculty effective December 31, 1997.

On October 23-24, Dr. Stephen Sheppard attended a workshop at Lake Tahoe on "Establishing the Worth of Scenic Values." This workshop was sponsored by the US

Forest Service, Tahoe Regional Planning Agency, EDAW Inc., and the US Federal Highway and was intended to give scenic resource practitioners more powerful arguments and techniques for promoting the importance of good scenic management in regional landscapes.

A search is currently underway for a person to fill our Endowed Chair in Hydrology, (2/3 Geography, 1/3 Forest Resources Management). The successful candidate will be expected to forge close

working ties between industry, government and universities and to conduct and direct research in applied watershed management. Inquiries and applications should be directed to Dr. Olav Slaymaker, Dept. of Geography at UBC.



## Influence of initial spacing on wood quality of three coastal conifers

**W**OOD quality is an issue of which we have heard more in recent years as the resources being devoted to intensive silviculture have increased. There is an increasing realization that not only do the silvicultural actions affect tree growth from volume or form perspectives but that the nature of the wood formed by these trees will also be affected. One of the silvicultural variables over which we have most control is the initial spacing distance at the time of planting.

The work described here is being performed on the trial plots at the UBC Malcolm Knapp Research Forest affectionately referred to by many as "Harry Smith's Spacing Trials". These plots were established from 1957 to 1959. Three species (Douglas-fir, western hemlock and western red cedar) are planted in the plots. The trees were planted at five different square spacings (3 ft, 5 ft, 9 ft, 12 ft and 15 ft) and there are two replicate plots of 49 trees for each species.

Mr. St  phanne Fabris, a Ph.D. student, has non-destructively sampled trees on the sites by taking increment cores at breast height for pith-to-bark analyses of density, fibre length and



*St  phanne Fabris collecting samples from Douglas-fir trees spaced 15 ft x 15 ft.*

cell wall microfibril angle. He has also sampled as many of the different species/spacing combinations as was feasible, and safe, by taking increment bores at two metre intervals up to the base of the live crown. This sampling process involved the use of tree climbing equipment to take samples as high as 22 m above the ground. This second set of samples has been used for density and ring width analyses. The information on wood properties obtained along with crown width and height measurement data will be used to reconstruct crown recession patterns over time and to measure the effects of inter-tree competition on the variability of wood properties observed.

X-ray densitometry analysis of the increment bore samples is complete as are the microfibril measurements. Fibre length measurements are currently underway and will be completed in early 1998. Analysis of the data will be conducted during the following spring.

*For further information, please contact Dr. Simon Ellis at (604) 822-3551; fax (604) 822-9104 or e-mail [sellis@unixg.ubc.ca](mailto:sellis@unixg.ubc.ca). □*

### DEPARTMENT NEWS

**O**n October 6, 1997, a Wood Design Workshop was held at Robson Square which was attended by more than 100 participants. The conference was organized by Drs. Helmut Prion, J.D. Barrett, and Frank Lam.

On June 20-21, 1997, Dr. David Cohen organized and chaired the International Meeting of IUFRO Working Unit 5.10.00 Forest Products Marketing at Tofino,

British Columbia, on the theme "Preparing for the Twenty First Century: Value Added Marketing for Value Added Wood Products." The proceedings are available from the Forest Products Society in Madison Wisconsin.

Jack Saddler co-organized the International Energy Agencies major symposium on "Bioconversion of Wood Residues to Ethanol" which was held in

Curitiba, Brazil. This meeting was attended by 250 delegates from around the world who were meeting to determine a strategy for alleviating green house gas emissions. □



## RESEARCH HIGHLIGHT

### Corridors: A critical evaluation

**L**ANDSCAPE ecology is an interdisciplinary field that attracts scientists, regional planners, landscape architects and a variety of land managers. Landscape ecologists emphasize the spatial relationships between features, and are concerned with how spatial arrangement affects important processes. Foresters have played an important role in the development of landscape ecology and have adopted many of the principles of landscape ecology in planning and managing forested lands. However, landscape ecology is a relatively young field and many of the accepted principles have not been subject to thorough scientific evaluation.

Developments and logging activities tend to fragment contiguous forest habitats. Percolation theory tells us that there is a critical amount of habitat that may be removed, beyond which organisms are no longer able to make their way across the landscape. For example, in simulated landscapes where species have limited dispersal abilities, you need more than 59.28% suitable randomly-distributed habitat for an organism to have an unbroken trail across the landscape. To counter-act fragmentation effects of dispersal and migration, foresters are making

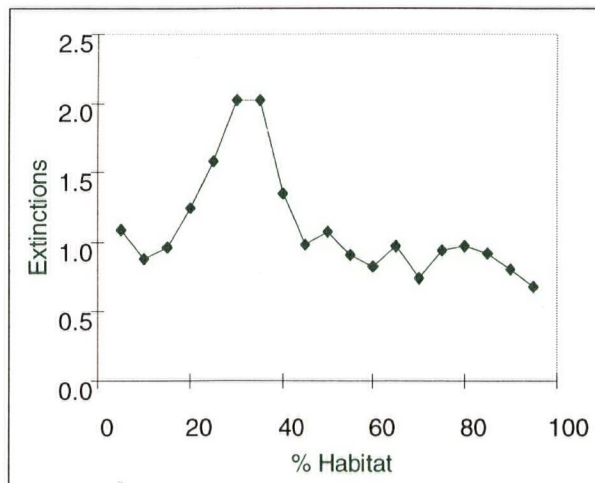
serious efforts to maintain forest connectivity and provide movement corridors for organisms. However, there is some evidence in the literature to suggest that corridors may have detrimental effects, especially if pest species or diseases are able to use them as well.

I was concerned about effects of connecting patches of sensitive habitats on invasive species dispersal and biodiversity. I modelled landscapes with different amounts of fragmentation and simulated the growth of several species. Species had negative effects on each other, which were

analogous to competitors, predators and their prey, or diseases. Species were able to drive other species found in the same patch of habitat to extinction. Extinctions were highest in landscapes with approximately 1/3 of the suitable habitat remaining (see figure). These were also landscapes with the most corridors ( $r^2 = 0.768$ ). Weak competitors can be constrained by strong competitors blocking corridors and making it less likely for a weak competitor to find refuges from competition.

These preliminary modelling results caution us that connectivity in certain types of systems, such as intermediately fragmented systems with invasive species, may be detrimental to some species. However, there are many instances when high connectivity is desired. For example, mule deer populations that migrate seasonally may require corridors of suitable habitat. Species in small populations susceptible to inbreeding depression may also benefit from dispersal corridors between populations. The autecology of the sensitive species in a system needs to be understood before effective systems of landscape corridors can be designed. In systems where some species may benefit and some species may be harmed by increasing connectivity, we may consider using different strategies in different areas to provide appropriate conditions for all species of concern.

For further information, please contact Dr. Susan Glenn at (604) 822-4131; fax (604) 822-9102 or e-mail [sglenn@unixg.ubc.ca](mailto:sglenn@unixg.ubc.ca).



Example of results from simulation models of landscapes with 30 species simulated for 10 years on landscapes with different percentages of remaining suitable habitat.

## DEPARTMENT NEWS

This year's Schaffer Lecture was given by Dr. Daniel Botkin, an expert in environmental studies. The lecture was held in conjunction with a Faculty Research Evening and over 200 people attended the event. Copies of Dr. Botkin's talk **"Getting the Paradigm Right: The essential ecological foundation for the conservation and sustainable management of British Columbia's forests and natural resources"** are available by writing to the Forest Sciences Department at UBC.

Dr. Michael Feller has recently been appointed as program director for the

Natural Resources Conservation program, taking over from Susan Glenn.

Dr. Scott Hinch's paper, "Use of electromyogram telemetry to assess difficult passage areas for river-migrating adult sockeye salmon", was selected by the American Fisheries Society as a finalist for Best-Paper-of-the-Year (1996) in their journal.

Dr. Cindy Prescott presented a lecture at the Soil Science Society of America Meeting on late stage decomposition and humus formation.

Dr. Hamish Kimmins is currently on sabbatical working on his new models FORCEE and HORIZON.

During October, Dr. Yousry El-Kassaby was in Italy and Germany. He presented three talks on the genetic evaluation of alternative silvicultural systems.

In November, Dr. John Richardson spoke at the World River Conference held in Japan on the conservation of stream ecosystem dynamics and biodiversity through streamside management. He also delivered seminars at the University of Hokkaido and the Hokkaido Forest Research Institute.



### New appointment



**Madeleine MacIvor** left First Nations House of Learning in November to join the Faculty of Forestry as the Coordinator of Forestry Programs for First Nations Students. Her work will build on the initiatives undertaken by Gordon Prest, who left the Faculty to return to Nicola Valley Institute of Technology.

Madeleine holds a B.Ed with a concentration in science education and an M.A. in science education from UBC. She brings with her a deep commitment to First Nations education and a strong background in both community liaison and student services. In her new role, Madeleine will continue to work on increasing the enrolment of Aboriginal students and collaborating with Faculty on curriculum which addresses First Nations perspectives and the changing context of forestry in British Columbia.

More specifically, the goals of this position include:

- increasing the participation of First Nations in UBC's forestry programs;
- exploring, developing and implementing promotion and recruitment strategies;
- providing support services for First Nations students;
- collaborating with the faculty in developing curriculum which includes First Nations perspectives and issues.

One of the initiatives that she will be following up on is the *Indigenous Perspectives in Forestry Education Workshop* which was held at the First Nations Longhouse in June, 1997. A summary of the workshop and a resource guide will be available on Internet in the new year.

*Madeleine is looking forward to working collaboratively with the Faculty to create meaningful and relevant curriculum changes and experiences. She can be reached at (604) 822-0651 or e-mail [macivor@unixg.ubc.ca](mailto:macivor@unixg.ubc.ca).* □

### Natural Resources Conservation Program Update

(submitted by Susan Glenn)

Conservation is not just preservation, or wildlife management but encompasses a variety of approaches and philosophies about land and people. The Natural Resources Conservation B.Sc. Program strives to encourage students to respect a variety of perspectives while developing their own personal views. These students will face complex issues in their careers, and need to understand how their decisions will affect others.

Students take an intensive 13 week field-based conservation course that integrates natural and human systems. Activities include restoring a trail in the alpine tundra, listening to endangered spotted bats, analyzing surveys of recreational users, touring a saw mill, and sampling fish communities. Jean Williams, an Elder with the Williams Lake Band, gave a presentation on First Nations perspectives on plants at the Alex Fraser Research Forest. The students listened to stories about village life and how the plants were part of it. Students learned about traditional uses of plants, and about respect for the land. The Manager of the UBC Research Forest, Ken Day, also showed how timber management in the area could be used to enhance mule deer winter range. A local rancher, Clint Thompson, discussed how mule deer feed on his hay every winter.

Career goals of Conservation students range through research, management, education, and activism. Some students graduate into careers in the forest industry and others work for non-governmental organizations. They are all required to take courses in natural sciences, economics, sociology, and ethics. In general, the students are highly committed to improving their understanding of natural and human systems.

We benefit from the involvement of people from outside the Faculty of Forestry. If you want to become involved, or simply desire further information on the NRC Program, please contact the Program Director, Dr. Michael Feller at (604) 822-3729 or fax (604) 822-9102. □

### What's up at the Centre for Advanced Wood Processing

The Centre for Advanced Wood Processing (CAWP) founded the Wood Products Quality Council (WPQC) this year. The WPQC will help B.C.'s value-added wood processing industry improve both the value of products manufactured and the overall efficiency and profitability of their operations. The WPQC offers a market credible certification of facilities and industry support.

An FRBC-funded project on improving the performance of optimizing chop-saws is continuing. The project will now determine the benchmarks of good and poor performance, following intensive studies conducted at six B.C. re-manufacturers.

The co-op education component of the undergraduate Wood Products Processing Program has been enormously successful. Since 1996, 22 students have

completed 40 work assignments of 4 or 8 months duration. These students have made a very positive mark in the wood industry. They have contributed significantly to their employers, in some cases saving them thousands of dollars annually. Employers' comments on the performance of the students have been excellent and the Co-op program boasts a 100% placement rate.

CAWP is planning many future industry activities including three Quality Control Workshops in the Spring of 1998, and a Tooling and Machining Workshop in February, 1998.

*If you would like information on upcoming events, please call us at (604) 822-6448; fax (604) 822-9159; e-mail [cawp@unixg.ubc.ca](mailto:cawp@unixg.ubc.ca), or visit our home page [www.cawp.ubc.ca](http://www.cawp.ubc.ca).*



# FOREST NEWS

## from the University Research Forests

### Environmental compliance

In 1994, UBC adopted an Environmental Protection Compliance Policy covering the entire University community. To help ensure compliance, we have spent the past year taking stock of environmental concerns and taking action as we feel appropriate. It soon became apparent that there were a number of historical details about the Research Forests that were uncertain, particularly about past use of chemicals, location of underground tanks, old sawmill and camp sites, dumps, pit toilets, mines and all manner of other "interesting" facilities. For example, on the Malcolm Knapp

Research Forest, Andy Marc employed a number of Japanese shake cutters to construct dwellings on what is now the Demonstration Forest. Andy also had a small sawmill, stables for horses, a chicken coop and a garbage dump. The Abernethy and Loughheed logging operation built railways and logging camps, and in the Marion Lake drainage there is an old site where several hundred loggers lived at one time. The same camp also serviced train engines. An old mining site on the Pitt Lake slopes was abandoned in the 1920's, but remnants can still be found, including the

old crusher and concentrator. The Alex Fraser Research Forest has additional challenges, including the use of the area by previous licensees, grazing leases, recreational sites, prospecting, and trappers' cabins.

The past year has seen considerable "sleuthing" to catalogue potential sites where environmental hazards may be found. Old engineering maps from the 1920's have been useful in this work.

In preparing for an environmental audit (to be done in 1998), our intentions are not merely to find old environmental hazards and deal with them, but to be proactive in our current activities, by carefully screening requests for research sites, and by practicing preventative maintenance. Each of the forty-five research projects initiated this year has been screened for potential environmental impacts. Old research projects that include potential environmental hazards have been flagged for detailed investigation. Such environmental awareness requires the equivalent of an additional full time staff person and a budget for remedial action as necessary. The "up side" is that we are improving the way in which we conduct our business and have significantly reduced the long term impact of our research and education in the forest.

For further information, please contact Peter Sanders, Director, University Research Forests at (604) 463-8148; fax (604) 463-2712 or e-mail [sanders@unixg.ubc.ca](mailto:sanders@unixg.ubc.ca). □

### Alumni gifts support faculty

To our generous alumni and friends — thanks for showing your support again this year. Foresters are the greatest!

This year's Alumni Telepledge Campaign took place in October with our volunteers phoning classmates and friends to say hello and encourage their support of forestry education. Our fundraising efforts were aided by "satellite" phone callers in Duncan, Prince George, Kelowna and Victoria. Many thanks to campaign co-chairs Russ Clinton and Charlie Johnson and their dedicated team of volunteers for a job well done. Thanks to all who participated and responded with their support.

Forestry alumni have a tradition of being among the strongest supporters of their faculty at UBC. Perhaps it is a shared belief in the critical importance of top-notch research and opportunities for future foresters.

Our future foresters are demonstrating their commitment already. Thanks to the Class of '98, a graduating gift will provide funds for a selection of artwork to go into the new Forest Sciences Centre (opening spring 1998).

#### Year-end tax receipts

If you haven't yet participated in this year's forestry campaign there's still time. Due to the postal strike, Revenue Canada has announced that you now have until January 31, 1998 to make a charitable donation.

For gifts received before January 31, tax receipts will be issued for the 1997 tax year. For your convenience, we can take your donation over the phone. One call to Tara MacKenzie with your credit card number and we'll have your tax receipt on its way to you (this also a great way to collect air mile points).

#### Donor honour roll

We will have the pleasure of recognizing all of our generous alumni and friends in the donor honour roll to be published in the March 1998 edition of *Branch Lines*. We will also feature class-by-class results of giving. *Can we include your name?*

#### Donating securities

A number of alumni and friends are taking advantage of favourable new guidelines to donate listed securities. The 1997 federal budget introduced a reduced rate of taxation on capital gains (only 37.5 per cent of the gain needs to be included in taxable income, instead of the old 75 per cent). If you are holding stocks that have appreciated in value, this can be a very effective way to combine tax planning with charitable giving. We would be happy to provide you with more information. Thank you!

Tara MacKenzie can be reached at (604) 822-8716; fax (604) 822-8645 or e-mail [tarscott@unixg.ubc.ca](mailto:tarscott@unixg.ubc.ca). □

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